

REMARKS

The Examiner is respectfully requested to reconsider the present application in response to the above amendments and the following comments. Claims 1-30 are present in this application. Each of these claims is submitted to be patentable for the reasons set forth below.

Drawings

The objection to the drawings is submitted to be overcome by the proposed revision to FIG. 1 marked in red on the attached drawing sheet. The reference character 78 has been added, along with the corresponding lead line, to designate the laminar formation referred to at paragraph 34, and elsewhere, in the specification. Approval of this drawing amendment, and withdrawal of the objection to the drawings, are respectfully requested.

Specification

The present amendment includes amendments to correct errors including those helpfully noted by the Examiner in paragraphs 30 and 32 of the specification. It is submitted that the objection to the specification should be withdrawn.

Claims

Formal Objections

In sections 3 and 4 of the Office Action, the Examiner objected to informalities in claims 1 and 26. The present amendment is believed to overcome each of these objections.

The amendment to claim 1 corrects the antecedent basis for "said rotation guide plate". Claim 22 has been amended to consistently refer to the "shutter blade". In view of these amendments, it is submitted that all of the pending claims are in proper form for allowance.

Patentability

Claims 1-30 were rejected as unpatentable over the prior art. Reconsideration is respectfully requested.

Claim 22

Claim 22 was rejected as anticipated by the Reinert reference (U.S. patent 6,550,939). Reconsideration is requested. Claim 22 is directed to a shutter assembly having a stack of disks that are rotatable relative to one another, a first plurality of the disks supporting shutter blades and a second plurality of the disks having drive members engaging the shutter blades. Claim 22 is not anticipated by the Reinert reference because the disks in the Reinert stack cannot rotate relative to one another, and because Reinert does not disclose disks in the stack having drive members engaging shutter blades.

Reinert discloses a stack of plates including (from right to left as seen in Reinert's FIG. 12):

a base plate 50;
a spacer plate 18 guiding movement of a shutter blade 10;
a separator plate 19;
a spacer plate 28 guiding movement of a shutter blade 20;
a separator plate 29
a spacer plate 38 guiding movement of a shutter blade 30;
a separator plate 39
a spacer plate 48 guiding movement of a shutter blade 40; and
a top plate 52.

None of these plates in the stack of plates is mounted for rotation relative to the others. "The top plate 52 is preferably secured to the base plate 50 by suitable fasteners 53." (Reinert, col. 8, lines 46-48). One fastener 53 is seen in Reinert FIG. 14. Comparing FIGS. 12 and 14, it is seen that the fasteners 53 extend through all to the plates 50, 18, 19, 28, 29, 38, 39, 48 and 52, preventing each of them from rotating relative to the others.

Instead of using relative plate rotation to cause movement of the shutter blades 10, 20, 30 and 40, Reinert employs a system of gears to move each shutter blade within a cut-out area of the corresponding spacer plate 18, 28, 38 and 48. This mechanism for moving shutter blade 10 is seen in Reinert FIG. 11. Pinions 16 and 17 may be rotated by drive motors to move rack gears 14 and 15 in a linear direction along edges 181 and 183 of the cut-out area in spacer plate 18. The rack gears 14 and 15 engage gear teeth 12 and 13 (FIG. 10) to move the shutter blade 10 in linear or rotational motions, for example to the positions of FIGS. 2-6. This structure is described at Reinert col. 8, lines 1-19.

The entire stack of plates 50, 18, 19, 28, 29, 38, 39, 48 and 52 can be rotated as a unit through about ninety degrees of rotation by a pinion 70 driven by motor 69 and engaging gear teeth 51 on the base plate 50 (see Reinert col. 7, lines 63-67 and col. 9, lines 17-29). Simultaneous rotation of the entire stack of plates simultaneously changes the rotational position of all four shutter blades, but does not move any of the individual plates or shutter blades relative to the stack.

In the Reinert assembly, each shutter blade is driven by pinions and rack gears. None of the stacked plates includes a drive member engaging a shutter blade. The pinion and rack gear drive for each shutter are not associated with any plate other than the one that guides the shutter blade.

Claim 22 is directed to a shutter assembly having a stack of circular disks, wherein the disks are mounted for rotation relative to one another. Because the Reinert plates are fastened together for simultaneous rotation only, claim 22 is not anticipated. Claim 22 is directed to a shutter assembly with a first plurality of disks supporting shutter blades, and a second plurality of disks having drive members engaging the shutter blades. In the Reinert assembly a first plurality of spacer plates 18, 28, 38 and 48 might be said to support the shutter blades 10, 20, 30 and 40. However Reinert does not disclose a second plurality of plates having drive members engaging the shutter blades. For this additional reason, claim 22 is not anticipated. It is submitted that claim 22 is patentable.

Claim 26

Reconsideration is requested of the rejection of claim 26 as anticipated by the Lange reference, U.S. patent 4,395,104. Lange discloses a shutter assembly for a camera wherein three shutter blades are mounted for pivotal movement (only one blade 6 being illustrated). The shutter blade 6 is pivotally mounted on a pin 7. The shutter blades are

located in a space between a locking or closing ring 3 and an opening ring 1. Relative rotation of the rings 1 and 3 pivots the shutter blade 6 because of engagement of a pin 9 on the opening ring 1 with a slit 8 in the shutter blade 6.

Claim 26 is directed to a shutter subassembly wherein a shutter blade is captured for sliding movement in a slot in a first guide plate. The shutter blade is coplanar with the first guide plate. Thus the shutter blade does not add to the axial thickness of the subassembly.

In the Lange assembly, the shutter blade 6 is not captured for sliding movement in the central opening of the closing ring 3. The Lange shutter blade 6 is not coplanar with the ring 3. The shutter blade 6 is pivoted behind the plane of the ring 3, adding to the axial thickness of the assembly. Claim 26 is not anticipated, and is submitted to be patentable.

Claims 1-6

Claims 1-6 were rejected for obviousness over the Reinert reference in view of a Steineck reference, U.S. patent 2,625,087. Reconsideration is respectfully requested. It is submitted that the combination of Reinert and Steineck is not proper, and further that claim 1 and its dependent claims 2-6 are patentable over the proposed Reinert in view of Steineck combination.

Independent claim 1 is directed to a shutter assembly including a stack of plates, of which a plurality are rotatable relative to one another. As discussed above relative to claim 22, in the Reinert assembly the plates 50, 18, 19, 28, 29, 38, 39, 48 and 52 are fastened together by fasteners 53 and cannot rotate relative to one another.

Claim 1 is further directed to an assembly in which a drive mechanism in the form of a cam and follower moves a shutter blade in response to rotation of a translation guide plate relative to a rotation guide plate. As also discussed above, the Reinert plates 50, 19, 29, 39 and 52 do not include any mechanism or member for driving the shutter blades 10, 20, 30 and 40 that are guided by the spacer plates 18, 28, 38 and 48. Because Reinert does not disclose driving the shutter blades with the plate 50 or any other plate, the proposed modification of Reinert with the Steineck structure can only be based on hindsight and is improper.

Even if the combination were made, the subject matter of independent claim 1 patentably differs from the resulting amalgamation. Steineck discloses a camera shutter assembly with numerous disks including a magazine cover disk 18 and a light screen disk 19. A stop-post 78 is carried by the disk 19 and is received in a slot 76 of disk 19 (Steineck, col. 9, lines 12-15). As best seen in FIG. 18 of Steineck, the slot 76 is spaced uniformly from the axis of the disks so that there is no cam action between the stop-post 78 and the slot 76. The Steineck post and slot function only to limit relative motion of the disks 18 and 19, and not as a cam. Therefore, a combination of Steineck with Reinert would not disclose or suggest the cam and cam follower drive mechanism of claim 1.

For these reasons claim 1 is submitted to be patentable over the prior art including the Reinert and the Steineck references. Dependent claims 2-6 are submitted to be patentable for the same reasons.

Claim 6 is submitted to be patentable for the additional reason that the prior art does not suggest making the plates and shutter blade from a single piece of sheet metal. This has the advantage that when stacked, the parts will inherently have the same thickness, avoiding binding and other problems. The Examiner cites no prior art in

support of the contention that use of a single sheet of metal would have been an obvious design choice. Claim 6 is patentable for this additional reason.

Claims 7-11 and 17-21

Reconsideration is requested of the rejection of claims 7-11 and 17-21 as having been obvious over the Reinert reference.

Independent claim 7 is directed to a shutter assembly including a stack of circular plates that are rotatable relative to one another. As discussed above, in the Reinert assembly the plates cannot rotate relative to one another.

Claim 7 is further directed to an assembly including a plurality of rings in a laminar formation defining a circular cylindrical nest. A stack of plates is received in the nest. Contrary to the Examiner's interpretation, the plates 19, 29 and 39 of Reinert do not form a laminar formation because they are separated by plates 18 and 28. In addition, the plates 19, 29 and 39 do not define a circular cylindrical nest for plates 18, 28, 38 and 48. The Reinert plates are interspersed and are not nested. As seen in Reinert FIG. 14, the stacked plates 50, 18, 19, 28, 29, 38, 39, 48 and 52 are exposed and are not contained in a nest of laminar rings or in any other structure.

For these reasons claim 7 is submitted to be patentable over the Reinert reference. Dependent claims 8-11 and 17-21 are submitted to be patentable for the same reasons.

Claims 8-11 are each submitted to be patentable for additional reasons. Using rings equal in number and thickness to the number and thickness of the plates has the advantage that the nest formed by the laminar rings is dimensioned to receive the stacked plates without binding or special machining or the like.

Claim 11 is submitted to be patentable for the additional reason that the prior art does not suggest making the plates and rings from a single piece of sheet metal. This has the advantage that when stacked, the parts will inherently have the same thickness, avoiding binding and other problems. The Examiner cites no prior art in support of the contention that use of a single sheet of metal would have been an obvious design choice. Claim 11 is patentable for this additional reason.

Claim 18 is submitted to be further patentable because it is directed to an assembly using sheet metal pinion gears in a stack of sheet metal rings. The prior art lacks any suggestion or incentive for modifying Reinert to incorporate a gear structure different from what the reference discloses. Absent any such suggestion, claim 18 is believed to be patentable.

For these reasons, claims 7-11 and 17-21 are submitted to be patentable.

Claims 12-16

The Examiner is requested to reconsider the rejection of claims 12-16 as having been obvious over the Reinert reference in view of the Steineck reference.

Claims 12-16 are dependent directly or indirectly on independent claim 7, and are submitted to be patentable for the same reasons as claim 7, discussed above.

Like claim 26 discussed above, claims 12-16 are directed to an assembly including cam structures and cam followers on the shutter blades. As also discussed above, the Steineck reference does not disclose a cam and cam follower mechanism. Claims 12-16 are therefore submitted to be patentable.

Claims 13-15 are submitted to be patentable for the additional reason that they are directed to an assembly in which the four shutter drive plates are adjacent to one another

in the stack. The prior art Reinert reference requires the spacer plates 18, 28, 38 and 48 to be separated by separator plates 19, 29 and 39. Reinert teaches that the separator plates are needed to retain the shutters 10, 20, 30 and 40 in their slots. The prior art lacks any suggestion that the shutter guide plates can be adjacent to one another without separators. Claims 13-15 are believed patentable for this additional reason.

Claims 23-25

Please reconsider the rejection of claims 23-25 for obviousness over the Reinert reference. These claims are directly or indirectly dependent on independent claim 22 and are submitted to be patentable for the same reasons as claim 22 as discussed above.

Claims 27-30

Reconsideration is requested of the rejection of claims 27-30 for obviousness over the Reinert reference. Independent claim 27 is directed to a method of making a stack including translation guide plates with cams and rotation guide plates with guide slots receiving shutter blades. The claimed method includes severing the translation guide plates, the rotation guide plates and the shutter blades from a single sheet of metal. An advantage of this method is that these severed parts inherently have equal thickness, and this solves assembly problems.

The Reinert reference is silent as to the source and manufacturing method for the plates 50, 18, 19, 28, 29, 38, 39, 48. The reference makes no suggestion that the plates and shutter blades may be severed from a single sheet of metal. The Examiner makes this unsupported and conclusionary statement "In this case, metal is considered an obvious engineering decision with respect to availability, low cost, and good thermal conductivity." (Office Action, paragraph 36, page 15). But claim 27 is not broadly claiming the use of metal. Because there is no hint in the prior art that the specified

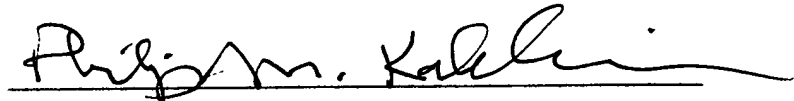
shutter assembly components should be severed from a single sheet of metal, claim 27 is submitted to be patentable.

Dependent claims 28-30 are submitted to be patentable for the same reasons as independent claim 27. Claims 28-30 are submitted to be additionally patentable for at least the same reasons as claims 12-16 discussed above. Claims 29 and 30 are submitted to be additionally patentable for at least the same reasons as claim 18 discussed above.

Conclusion

Claims 1-30 are present in this application. It is submitted that each of these claims is patentable for the reasons set forth above. It is further submitted that the drawings, specification and claims are in proper form. Allowance of the present application is therefore respectfully solicited.

Respectfully submitted,

A handwritten signature in dark ink, appearing to read "Philip M. Kolehmainen", is written over a horizontal line.

Philip M. Kolehmainen
Reg. No. 22,992
Telephone No. 312-987-2914